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European Gas Demand and Alternatives to Siberian Gas

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I. European Gas Demand and Alternatives to Siberian Gas

A. Although West European demand for gas has softened in recent years, the falloff is expected to bottom out this year and demand to revive as economic recovery begins.

1. Several industry forecasts estimate that demand for gas in Western Europe will increase from about 3.6 million barrels per day oil equivalent (b/doe) in 1980 to about 4.1 million b/doe in 1990 and to 4.5-5.0 million b/doe by the year 2000.

2. As domestic West European supplies of gas are depleted or shut in, the import dependence of the region will rise--from 13 percent currently to about 50 percent by the turn of the century.

3. Provided some new deliveries of Soviet gas begin in the late 1980s, West European countries expect to be able to meet projected demand through 1990 from supplies they have already lined up.

   -- West Germany and France have signed contracts, including those for Soviet gas, that will probably give them access to more gas than they will use in the 1980s.

   -- Italy still has not finalized negotiations with Algeria and the Soviet Union to fulfill gas requirements for the 1980s.

4. For the 1990s, however, West European countries will have to line up new supplies of 1.2 to 1.3 million b/doe.

5. The Soviets are anxious to increase gas exports to Western Europe and, with the completion of the Siberian gas pipeline, could more than double current sales by 1990.

   -- The Soviet Union is currently delivering about 430,000 b/doe of gas to Western Europe.

   -- Total Soviet gas exports to Western Europe in the late 1980s could be about 900,000 b/doe, about 25 percent of West European gas requirements and 3 percent of total energy needs.

6. If the West Europeans were to forego increases in Soviet gas deliveries they could technically balance supply and demand through the decade. However, the economic and political decisions necessary to bring about this combination of events would require a major reversal of existing policies.

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-- Increased production of Dutch gas would be needed.

-- Development of Norway's Sleipner field would have to be accelerated.

-- Domestic production in France, West Germany, and Italy would have to be sustained or increased from present levels.

-- Gas consumption would probably have to fall below present expectations.

B. Maximizing non-Soviet supplies in the 1990s will depend on Western Europe's assessment of the relative costs of alternative gas supplies and their concerns over security and diversification of supplies.

1. Norwegian gas offers a secure but costly alternative to Soviet gas in the 1990s.

-- Norway could supply an additional 670,000 to 830,000 b/d oil equivalent, which would cover the bulk of the increase projected for West European demand in the 1990s.

-- Deliveries from the Block 31/2 (Troll) field in the North Sea could reach 500,000 to 670,000 b/d oil equivalent by the late-1990s.

o New technologies must be developed to exploit the field, which lies in very deep water and contains a thin oil layer that could delay development.

o It would cost $15-20 billion to develop and deliver 500,000 b/doe of gas directly to the continent.

-- Another area for potential development is the Tromsa area off the northern coast of Norway.

o Recent discoveries indicate a large reserve potential, but simultaneous development of Tromsa and Troll is unlikely and transportation of gas from Tromsa is likely to be very expensive.

-- Norway's Sleipner area--with reserves of about 8 trillion cubic feet--offers the greatest potential for development in the near term.

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2. The United Kingdom is not likely to become a net exporter of gas to the continent but could serve as a conduit for Norwegian gas.

   -- If such a triangular deal could be arranged with Norwegian gas from Sleipner going to the UK in exchange for UK gas to the continent, 170,000 to 250,000 b/d oil equivalent could be delivered in the early 1990s.

   -- Development and pipeline construction costs could total about $6 billion.

3. West European importers' most reliable and economical source of additional gas would be the Netherlands, currently Western Europe's largest gas supplier.

   -- Unless the current conservation policies of the Hague change, however, the amount of Dutch gas available for export in the late 1990s will dwindle to less than one-fourth its present volume.

   -- Should the Dutch opt to sell more gas in the 1990s, the most they could provide would probably be about 150,000 to 200,000 b/d oil equivalent for a few years.

4. Gas production on the European continent is expected to decline over the next two decades. Intensified exploratory drilling might slow the expected decline but probably will not yield large additional supplies for Europe.

5. West European imports of LNG from Nigeria, Cameroon, Qatar, or other sources could total 150,000 b/d oil equivalent but would be very costly and could pose security risks.

   -- Nigeria's Bonny LNG project might be restructured at half the original size but would not be complete until the early 1990s.

   -- Qatar could supply sizable quantities of gas in the mid to late 1990s but transportation costs would be very high.

6. Gas imports from North Africa or the Middle East via pipeline could offer a more economical alternative than LNG imports, but may be politically undesirable.

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-- Additional gas could be delivered in the mid-1990s through existing pipelines from Algeria to Italy, and up to 250,000 b/doe through a possible new pipeline to Spain.

-- The proposed Iranian gas pipeline to Europe via Turkey, still has to undergo an economic feasibility study and could pose serious security risks.

-- Various proposed pipelines from the Middle East are probably neither economically nor politically feasible.

7. US coal could provide some additional energy supplies to Western Europe by 1990.

-- Western Europe would need to expand coal handling capabilities even further.

-- Some type of subsidy would probably be needed to encourage greater use of coal in industry.

C. Although steps are being taken to expand gas storage capacity in Western Europe, growing dependence on imported gas in the late 1980s will increase vulnerability to disruptions.

1. By 1990, gas supplies subject to disruption (from Algeria, Libya, and the Soviet Union) could supply almost 40 percent of overall gas demand in Western Europe and an even higher percentage in France and Italy.

2. The seasonal nature of gas demand will tend to magnify the potential impact of a disruption.

3. Potential Dutch surge capacity over existing production levels is estimated to be 1.7 million b/doe, sustainable for one year.

4. Plans call for gas storage capacity to be increased more than 50 percent by the mid 1980s.

-- Current storage capacity is the equivalent of only 35 days average 1981 consumption.

-- Much of the storage capacity will be required to meet peak seasonal demand.

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Case I

(No Siberian Gas)

- This graph shows declining indigenous production particularly after 1985 as West European gas supplies are depleted or shut in.
  - By 1990, indigenous production would approximate 95 billion cubic meters (bcm), falling to about 60 bcm by the year 2000.
  - Contracted Norwegian exports are then shown at about 20 bcm in 1990, falling to 12 bcm by 2000.
  - Contracted Soviet exports follow at 26 bcm in 1990 and 18 bcm by 2000.
  - Existing contracts call for North Africa to provide approximately 26 bcm in both 1990 and 2000.

- A supply shortfall begins to emerge after 1990, increasing substantially as already contracted supplies (excluding Siberian gas) fall short of projected demand. With demand at 200 bcm, the shortfall will be almost 30 bcm in 1990. The gap widens to 108 bcm in 2000 when demand reaches 226 bcm.

- Without Siberian gas, Norwegian gas coupled with Algerian gas, US coal, some LNG and a slower rate of the phase out of Dutch exports could theoretically balance supply and demand. However, the economic and political decisions necessary to bring about this combination of events would require a major reversal of existing policies within the next few years, which does not appear likely.
  - Norway is reluctant to speed up development because of concerns over the impact it would have on the domestic economy. Consumers may be unwilling to pay the high prices demanded by the Norwegians for new gas contracts. In addition, private companies may be unable to finance major gas development projects.
  - Algeria's militant pricing policy and its unilateral suspension of gas deliveries to France and the United States in 1980 make it a high-priced and potentially unreliable supplier.

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- The US can provide some additional coal by 1990. Western Europe already has ambitious plans to use coal and would need to expand coal hauling capabilities even further. Some type of subsidy would probably be needed to encourage greater industrial coal use.

- LNG from North Africa or other sources would be very costly.

- Without a change in the current conservation policies of the Hague, the amount of Dutch gas available for export in the late 1990s will dwindle to less than one-fourth its present volume.

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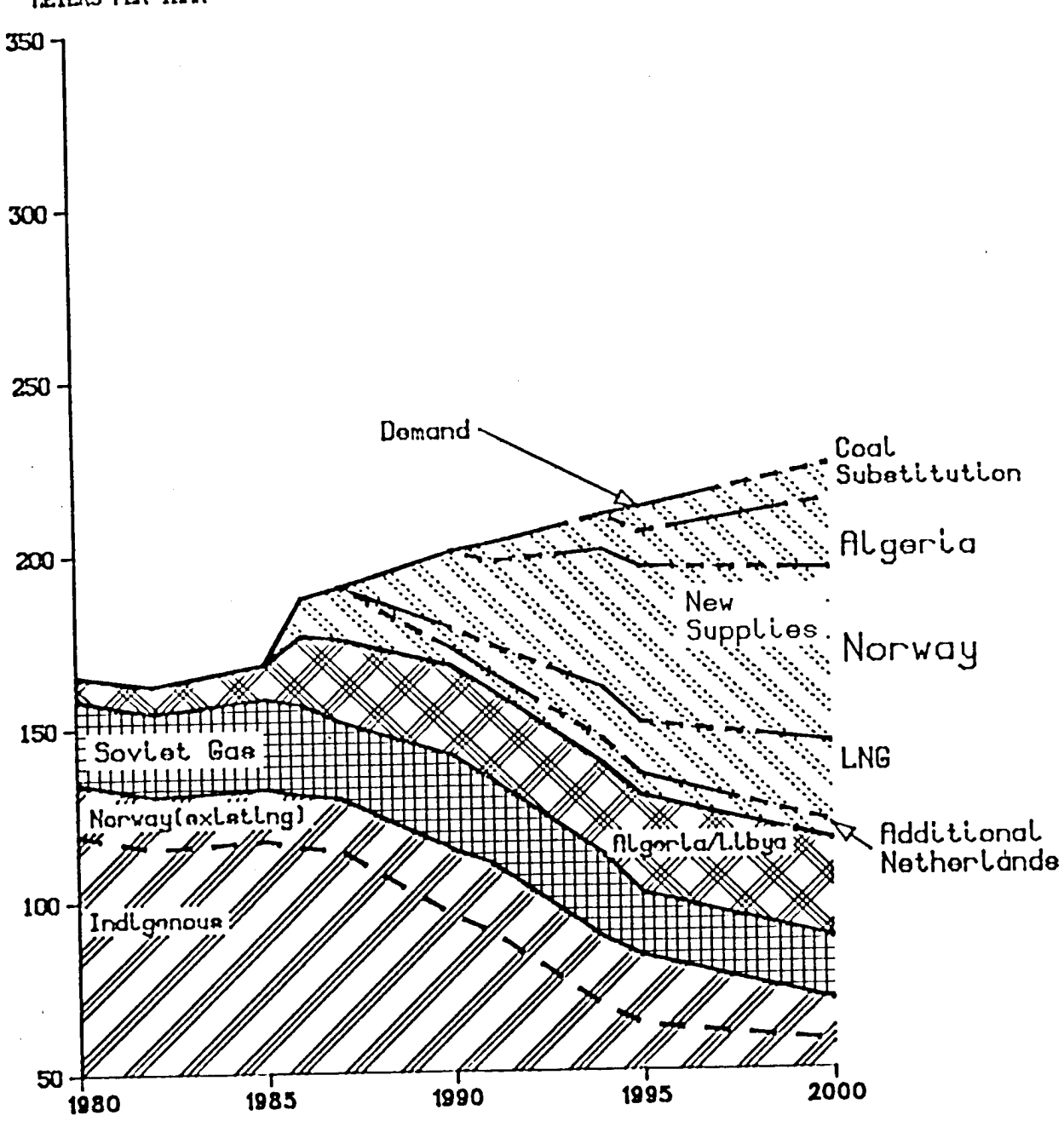
Continental Europe: Natural Gas Supply and Demand Forecast 1980–2000



Case I:
No Siberian Gas

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Case II

(Limitation of Soviet Gas to Existing Contracts)

- This graph assumes that the Siberian pipeline is completed and that no new gas contracts beyond those presently being contemplated are agreed to.

- Siberian gas purchases will probably provide 23 bcm (minimum) or 32 bcm (maximum) in both 1990 and 2000, supplementing existing Soviet gas supplies which will steadily decline from about 26 bcm in 1990 to almost 18 bcm in 2000.

- Siberian gas will not eliminate the prospect of a supply shortfall in the 1990s. Assuming minimum purchases of Siberian gas, the shortfall is likely to be about 85 bcm in 2000. With maximum purchases the shortfall would probably approximate 80 bcm in 2000.

- In this case, substantial volumes of additional gas will not be needed until the mid 1990s. This cushion could provide the lead time required to bring major gas projects on line from the North Sea.

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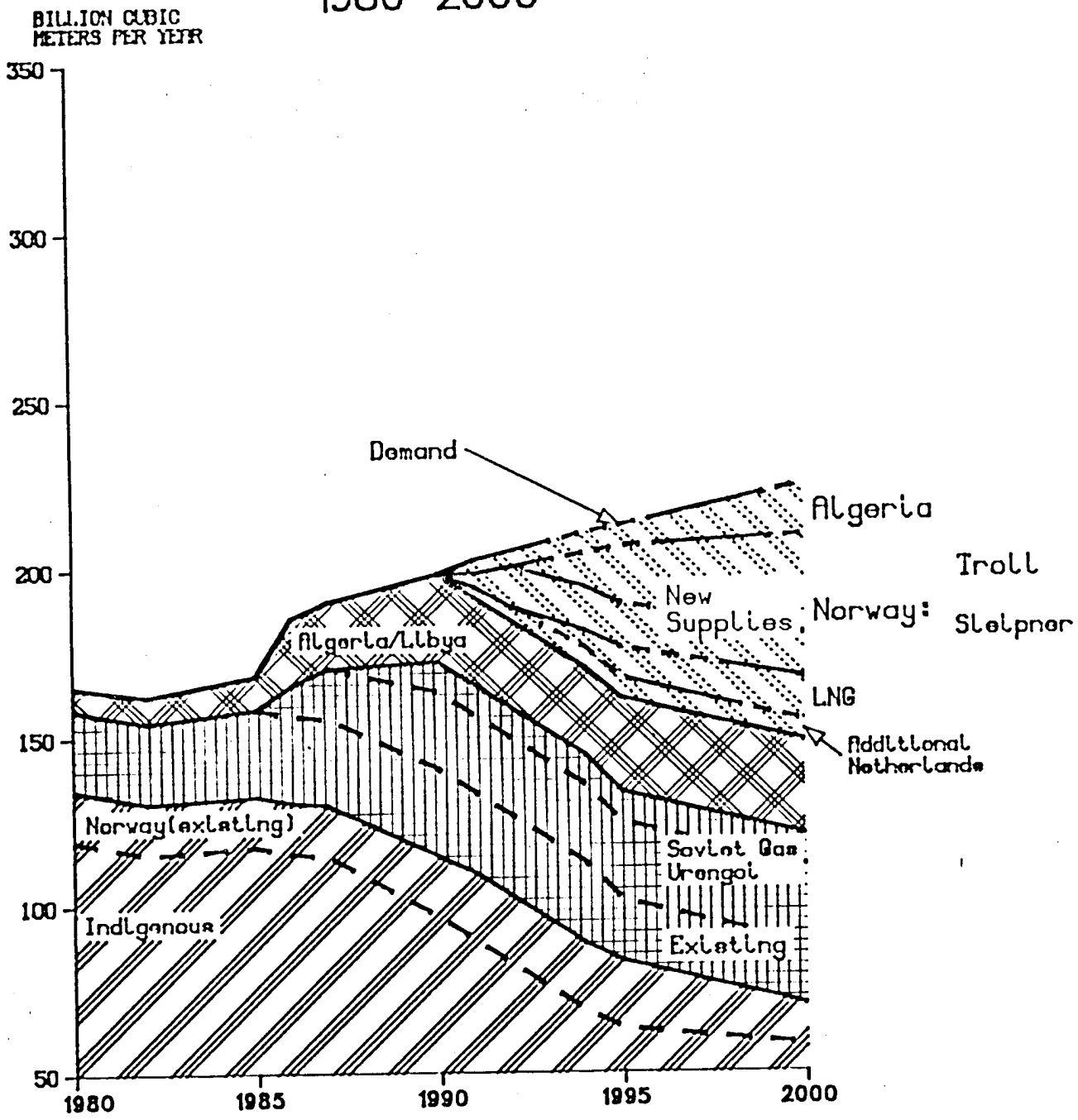

Case II:
Limitation of Soviet Gas to Existing Contracts

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Case III

(Maximum Utilization of Existing and Planned Soviet Pipelines)

- Completion of the Siberian pipeline to the Czechoslovak border will add approximately 29 bcm of capacity to the probable current Soviet export capacity of 56-60 bcm, bringing the system's total export capacity to 85-89 bcm. After accounting for gas sales to East Germany and Western Europe including 20 bcm of Siberian gas, excess capacity of the Soviet-Czech system would total 22-26 bcm. If Italy decides to purchase 6-8 bcm of Siberian gas, the system's total excess capacity will drop to 16-18 bcm by 1990.

- Expansion of the Czech domestic network in addition to the 29 bcm Siberian pipeline capacity would yield an excess capacity in the Czech system of about 11-13 bcm. (Italy's purchase of 6-8 bcm is factored into this calculation.)

- With projected excess capacity on the order of 16-18 bcm, the Soviets could effectively capture an even larger share of the West European gas market in the 1990s. The Soviets could:

  - reduce the market for Troll gas to about 20 bcm. A reduction in the market for Troll gas could render field development uneconomical until the late 1990s.

  - or eliminate any North African projects such as Algerian gas, Nigerian or Cameroonian LNG.

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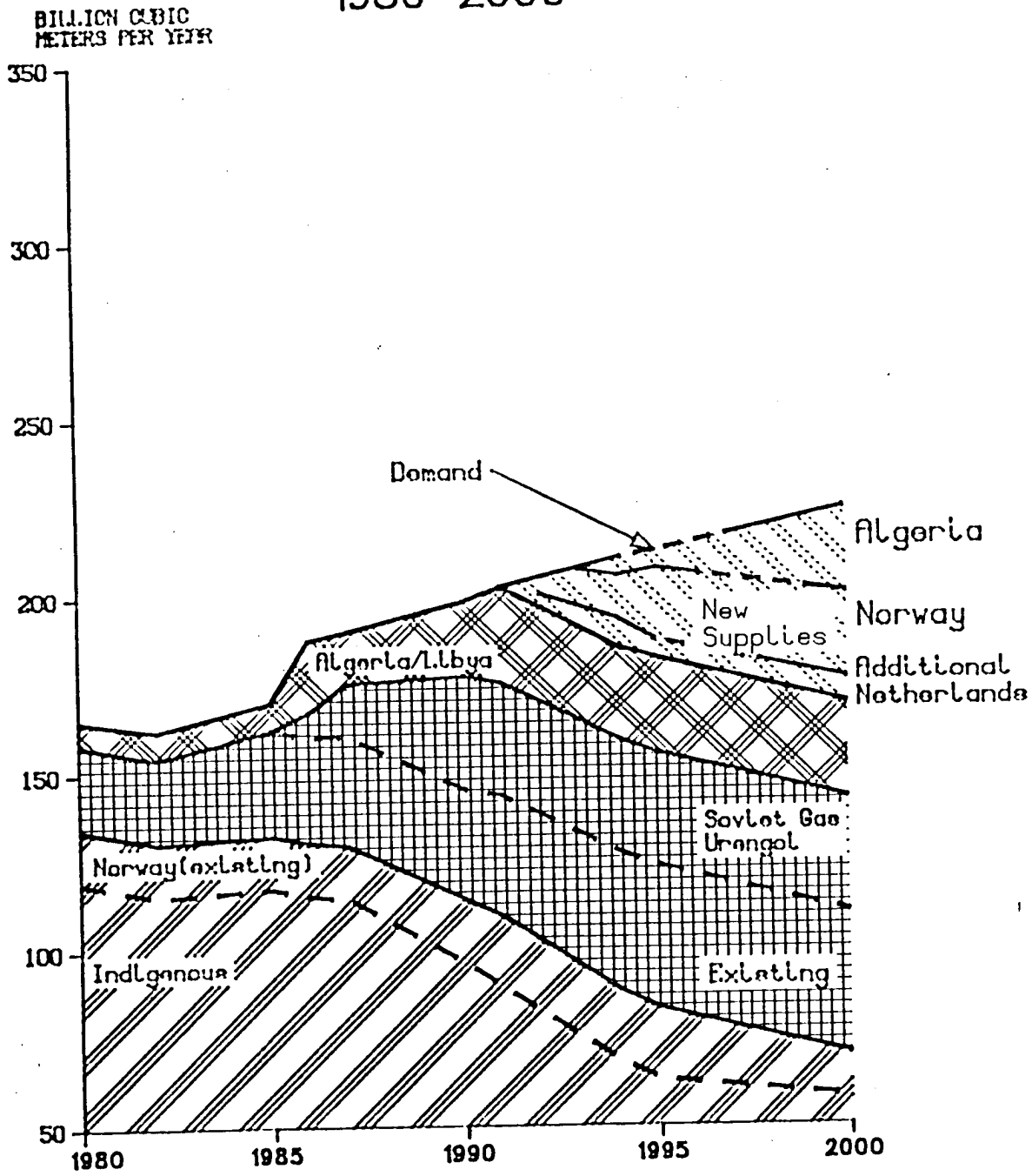

Case III:
Maximum Utilization of Existing and Planned Soviet Pipelines

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Case IV

(Second Strand of Siberian Pipeline)

- Construction of a second strand Siberian pipeline could bring an additional 30 bcm of Soviet gas to Western Europe.

- The market for gas from other suppliers would shrink to only about 20 bcm in the year 2000.

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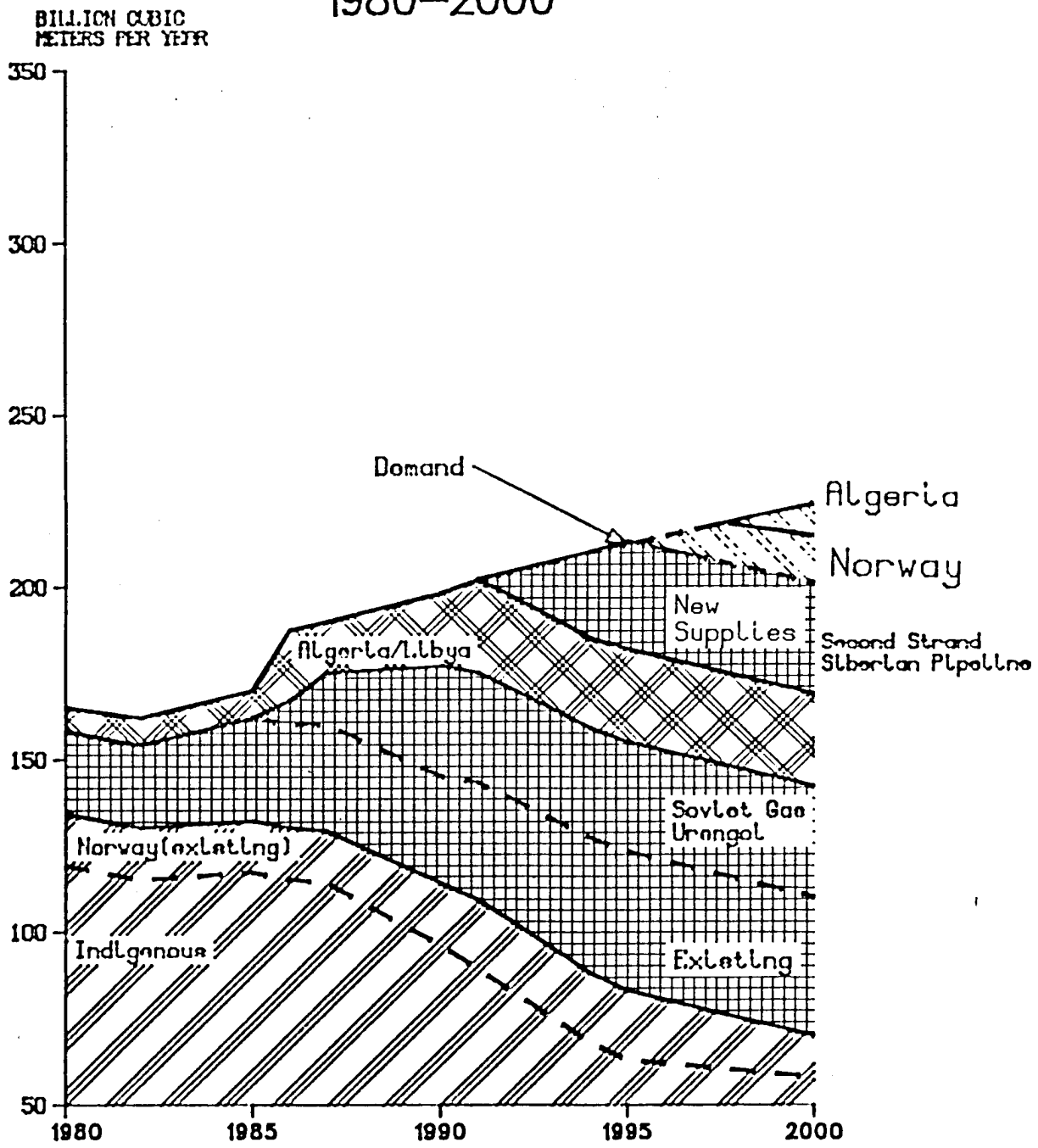

Case IV:
Second Strand of
Siberian Pipeline

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Western Europe: Dependence on Soviet Gas

(Percent of Total)

	Case I		Case II		Case III		Case IV	
	1985	2000	1985	2000	1985	2000	1985	2000
Soviet Imports	15	8	15	22	18	32	18	46
Other Imports	6	32	6	25	4	22	4	16
Domestic Production	79	60	79	53	78	46	78	38
Total	100	100	100	100	100	100	100	100

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Estimated Soviet Hard Currency Earnings*

(Billion $ US)

Case I		Case II		Case III		Case IV	
1985	2000	1985	2000	1985	2000	1985	2000
4.3	3.0	4.3	8.3	5.0	12.0	5.0	16.9

* Price at 1982 dollars - $4.70 per million btu.

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